

ZIMM Industrial gearboxes

Spiral bevel, angle, spur, transfer,
planetary and bevel planetary gear units

Assembly | Operation | Maintenance | Inspection



Original operating manual

Issuer

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This operating manual is also available for download in other languages.



Additional interesting information on industrial gear units and suitable components can be found on our website



1 About this document

1.1 Using this operating manual

This operating manual is part of the ZIMM industrial gearboxes.

- ➔ Read the operating manual carefully before use.
- ➔ Keep the operating manual for the entire service life of the gearbox.
- ➔ Keep the operating manual available to operating and maintenance personnel at all times.
- ➔ Forward the operating manual to the following owners or users.
- ➔ Update the operating manual whenever a supplement is received from the manufacturer.

1.2 Symbols and labels

Symbol	Meaning
 DANGER	Hazardous to persons. Non-compliance can lead to death or severe injuries.
 WARNING	Hazardous to persons. Non-compliance can lead to slight injuries.
 CAUTION	Hazardous to persons. Non-compliance can lead to slight injuries.
CAUTION	Information on avoiding material damage.
 NOTE	Note on understanding or optimising the workflow
✓	Prerequisite for an instruction manual
➔	One-step action request
1. ... 2. ...	Multi-step action request. ➔ Observe sequence.
	Maintenance and repair instructions

Tab. 1: Symbols and labels

2 Safety

These safety instructions apply in addition to the specific product operating manual and must always be complied with for safety reasons. These instructions apply to gearboxes, their components and add-on components (such as motors, oil systems, etc.); these all are summarised/designated as gearboxes in further instructions. The safety instructions are intended to protect people and objects from injuries and dangers arising from the improper use, incorrect operation, inadequate maintenance or other faulty handling of gearboxes in industrial facilities.

WARNING

RISK OF INJURY!

- Gearboxes have rotating surfaces which can become hot under some circumstances. All warning and information signs on the machines must be strictly observed.

WARNING

RISK OF BURNS!

- The housing surfaces can become hot under certain operating conditions, even if oil temperatures are within the permissible range.

This operating manual contains no details or instructions on occupational safety; such documents must be included with the product by the end producer. If the gearbox is used, the end producer is required to cover the rotating shaft ends and the parts attached to them. The gearbox must be set up so that it is not exposed to any harmful effects (such as water, chemical fumes, acid, and extreme temperatures). If these instructions are violated or not followed, or if unauthorised parties interfere, the gearbox manufacturer does not assume any warranty and any resulting claim for damages will be rejected. The manufacturer must be consulted in the event of additional axial and radial forces or torque to the gear shaft ends that were not previously mentioned here. The gearboxes shall be used in accordance with the respective contract.

2.1 Duties of the operator

CAUTION

All necessary work on electrical and mechanical drive systems, including planning, transport, assembly, installation, commissioning, maintenance and repair, may be performed only by adequately qualified personnel.

- ➔ Ensure that ZIMM industrial gearboxes are operated and maintained only in compliance with this operating manual and the applicable provisions and guidelines of the country concerned.
- ➔ Ensure that the personnel
 - are trained and qualified for the activity they perform,
 - have read and understood this operating manual,
 - systematically follow the instructions in the operating manual
 - know the relevant standards, provisions, accident prevention regulations and safety regulations
 - have been appointed and authorised by the person responsible for plant security and
 - wear personal protective equipment (PPE) (gloves, safety helmet, and safety shoes).

Qualified personnel shall carry out necessary activities as appropriate, while considering any risks that might need to be recognised and avoided. Knowledge of first aid measures and local rescue facilities are also necessary. Unqualified personnel shall be prohibited from working on the gearboxes. Work must be monitored by responsible specialists.

3 Intended use

These gearboxes are meant only for commercial facilities unless otherwise expressly agreed. They conform to the contractually agreed standards. Use in Ex zones is prohibited unless expressly provided for in these instructions (pay attention to additional instructions). If, in exceptional cases, the gearboxes are used in non-commercial facilities and more stringent requirements are imposed (such as guards to protect children's fingers, etc.), the operator must ensure those conditions when the system is set up. The gearboxes are designed and manufactured in accordance with the specifications in each order. Any divergent information on the type plate must be strictly taken into account.

CAUTION

The conditions at the site must comply with all documentation relevant to performance specifications (such as a dimension drawing or type plate). Gearboxes are components to be installed in machines as defined in the Machinery Directive 2006/42/EC. Commissioning is prohibited until it has been determined that the end product is in conformity with this directive (in compliance with EN 60204-1).

4 Type plate



Fig. 2: ZIMM industrial gearboxes type plate)

- | | | | |
|---|---|---|----------------------------------|
| 1 | Manufacturer / country of manufacture / web address | 5 | ID number gearboxes (continuous) |
| 2 | Type designation | 6 | Gearbox weight in kg |
| 3 | Article number | 7 | Amount of lubricant in l |
| 4 | Lubricant | 8 | Year of build |

5 Transport and storage

5.1 Transport

→ When the gearboxes are transported:

- the ring bolts in accordance with DIN 580, if provided for in the construction, must be sufficiently screwed in with adequate thread depth, lie evenly with their entire surface touching the contact area and be firmly tightened,
- all ring bolts intended for that purpose must be used,
- the ring bolts must be used exclusively for transporting the drive unit, not for the joint lifting of the drive unit with the driven machine and
- if replacements are necessary, only ring bolts that comply with DIN 580 may be used.

DANGER

Falling load!

A falling load can lead to severe injuries.

- Ensure that the chain or belt used is securely fastened and cannot slip.
- Do not stand under the suspended load.
- Wear personal protective equipment.

CAUTION

The gearboxes may be transported only with the ventilation (dipstick) facing upward. The gearboxes must be stored on level surfaces, not on top of each other, and secured against contact damage.

CAUTION**Damage to a ZIMM industrial gearbox!**

- On receipt, check the packaging for damage.
- Report any damage to the transport company immediately.
- Use suitable lifting gear.
- In the event of damage, commissioning might have to be ruled out.

! NOTE

Make sure the gearboxes are filled with oil according to the agreement.

5.2 Storage

- If gearboxes are stored,
 - make sure the environment is dry, free of dust, and has a low level of vibration ($v_{\text{eff}} < 0.2\text{mm/s}$) and an evenly maintained temperature (standstill damage)
 - there is a risk of breakage at very low temperatures $\leq -20\text{ }^{\circ}\text{C}$

If the gearboxes are stored properly, the manufacturer grants a 12-month warranty period for internal gear unit preservative and a 6-month warranty for the conservation of the protruding shaft journals (subject to deviations). The term of the guarantee begins on the date the gearbox is delivered.

Storing the gearbox for a long time reduces the service life of the lubricant and seals. No guarantee will be assumed for damage attributable to improper storage.

6 Setup, assembly

- Before installation,,
 - clean the gearboxes of corrosion protection agents and foreign matter clinging to them
 - lightly grease all uncoated areas

CAUTION

Risk of being cut, trapped, or crushed!

- Switch the entire system off and make sure it can't be switched on again.
- Allow only trained personnel to work on it.
- Do not remove any covers.
- Wear personal protective equipment.

Sharp edges!

Injury from being cut.

- wear protective gloves.

The gearbox must be fastened in the intended position with its feet or flange. Slip-on gearboxes with hollow shafts must be threaded onto the driven shaft by using the intended tools. Gearbox foundations must be stored safely, and shocks and resonance vibrations must not be initiated or extended. Steel constructions on which gearboxes are installed must be secured against torsion. Fasteners, steel construction, substructure and torque support must be measured according to expected high forces and torques (e.g. the dimensions and torque value of the gearbox) and adequately secured against loosening.

NOTE

Moreover, external forces and torques must be kept from being transferred to the gearbox so that the functional security of the gearbox is guaranteed.

The gearbox manufacturer is not responsible for damage caused by shifting the foundation or steel substructure. The working shaft(s) and any possible second shaft end, and the transmission components (couplings, sprockets, etc.) must be secured against direct contact (covers).

NOTE

Installing and operating the entire system can bring about additional risks.

- Observe regional regulations, and implement requisite measures (e.g. risk assessment).
- Document all additional risks in the documents of the overall system.

6.1 Alignment, connection

When setting the gearbox down on its foundation and aligning it, make especially sure that the contact surfaces are even so that the gearbox housing will not be distorted when the screws are tightened. For the gearboxes, fastening screws of at least strength class 8.8 are needed. If additional radial and axial forces were agreed for the gearbox's shaft ends, the fastening screws must comply with the strength class agreed in the contract. The gearbox must be aligned horizontally unless a different incline is indicated in the scope, and the greatest deviation may not exceed 2mm height in 1m length. When aligning the shaft ends with the connecting machines, the permitted tolerances of the couplings to be installed must be complied with. The shafts must not be allowed to get jammed in their bearings. Make sure the shafts are not displaced during operation, e.g. by gear pressure or temperatures.

DANGER

All work may be performed only by qualified specialists on idle machines which are secured against restart. This also applies to auxiliary circuits (such as anti-condensation heating). Transport locks must be removed before commissioning. The drive must be protected against overloading and, if there is a risk of unintentional startup, against automatic restart.

6.2 Commissioning



When the gearbox is at standstill, the oil status (oil level) must be in the middle of the oil inspection glass or under the oil control mechanism. The oil quantity information on the machine tag is only an approximate value. Oil may not be refilled during operation.

- The gearbox may be put into operation only under the following conditions:
- the oil temperature lies within the indicated temperature limits
 - any protective films have been removed,
 - the function has been inspected in neutral by loosening the mechanical connection to the driven components (in so doing, feather keys must be removed or secured so that they cannot be ejected)

After commissioning, the gearbox must be observed for at least one hour for unusual heating or noise.

During operation, a lubricant temperature of max. 110 °C is permissible.

If the shaft ends lie within an area of possible direct contact, they must be securely covered by the installer or operator against such contact.

6.3 Components

If the gearbox is supplemented with additional components (such as a brake or motor), follow the additional documentation of those components. If there is no such documentation, it must be requested from the responsible manufacturer.

7 Operation and maintenance

WARNING

Rotations in the danger zone!

Severe injury or death.

→ Leave the danger zone and secure it.

7.1 Inspection

ZIMM industrial gearboxes must be inspected regularly to ensure smooth operation:

- First inspection after 1 month at the latest
 - Additional inspections at least once annually
1. Log all inspections; for templates see "Appendix: Inspection log", page 22.
 2. Changes compared to normal operations, e.g. higher temperatures, vibrations, noises, etc., suggest that the function is impaired. To avoid disruptions that could directly or indirectly lead to personal injury or property damage, the responsible maintenance personnel must be informed. If case of doubt, shut the gearbox off immediately.
 3. The lubrication intervals specified in the respective operating manual for the bearings and the gearbox must be complied with.
 4. Worn or damaged parts must be replaced with original replacement parts or standard parts.
- If problems cannot be identified and remedied:
contact ZIMM Germany GmbH.



Maintenance includes, among other things, checking the temperature of the bearing locations and checking oil status (measuring and refilling only when the gearbox is at standstill) checking oil change, checking noise generation, checking oil tightness and the cleanliness of the air vent or ventilation bore.



The ventilator must be protected and kept clean at all times.

CAUTION

We expressly inform you that replacement parts and accessories which have not been delivered by ZIMM Germany GmbH have not been inspected or approved by us. The gearbox manufacturer assumes no liability or warranty for damage caused by using non-original replacement parts or accessories. Using non-original parts can alter the gearbox's properties as predetermined by the design and therefore impair its functional reliability.

7.1.1 Visual inspection

- ✓ Machine switched off and secured against being switched back on.
- 1. Check the spindle's lubrication and, if necessary, relubricate it and change the maintenance schedule.
- 2. Inspect the screws for fastenings and for coupling/connecting shafts, and retighten them if necessary.
- 3. Visually inspect the elastic spiders.
- 4. Run the machine, and pay attention to the following:
 - no jerks or vibrations
 - no excessive noise generation
 - consistent power consumption
 - heat development stays in the permissible range

7.2 Lubrication

Unless otherwise agreed, the gearbox will be lubricated through splash lubrication. During that lubrication, the roller bearings will also be automatically supplied with lubricant. During oil lubrication, the gearbox's interior will be aerated and ventilated through a breather at the uppermost point of the housing. In all cases in which gearboxes are installed a free atmosphere or in places where thermal conditions change strongly, a test for accumulated condensation must be performed in addition to the inspection (see paragraph 10) to prevent the interior parts from becoming corroded if there are long intervals between operations. If gearboxes are inactive for a long time, we recommend treating them with anticorrosive oil according to the manufacturer's normal specifications. If that oil is not compatible with the lubricant, it must be completely removed when the gearbox is started up again. Depending on their position when installed, gearboxes must be filled with oil only up to the lower oil checking device.

CAUTION

The specifications for oil viscosity and oil groups on the type plate, the information in the technical data sheet, and the instructions in the operating manual for the gearbox must be complied with! Differing gearbox oil properties are permitted only after consultation.

7.2.1 Lubricant replacement intervals

If the gearbox is lubricated with mineral oil, it must be changed after the first 500 hours of operation. Additional oil changes must be performed after 10,000 hours of operation.

⚠ WARNING**RISK OF SCALDING!**

Hot gearbox oil can lead to severe burns. Warning and information signs on the machine must be strictly followed. Make sure that suitable protective measures are taken.

The oil must be drained at operating temperature. After the oil has been drained, the gearbox must be flushed. The flushing oil must be compatible with the gearbox oil used. Only after the oil sludge, erosion, and the residual gearbox oil are removed may fresh oil be added using a fine-meshed hair sieve. When changing the oil, make sure everything is as clean as possible. If the manufacturer of the gearbox has given it a synthetic lifetime lubrication, this specification is omitted. However, even that lubricant must be replaced after 5 to 7 years. During a grease lubrication, the gearboxes must be partially disassembled and the parts must be washed. The new quantity of grease must be measured so that only a few air pockets build up in the gearbox. When changing synthetic oil, proceed as you would when changing mineral oil.

Do not use oil containing sulphur, as it is incompatible with the shaft seals (you may use other alloyed oils with the same properties). See the operating manual/lubrication recommendation for an up-to-date, complete overview of the oils to be used. If this was not enclosed, request it from the gearbox manufacturer.

8 Cleaning

! NOTE

Do not clean the gearbox with solvents that would damage the sealing elements. Cleaning with pressure blast devices is generally forbidden. The guarantee is immediately forfeited if any water or solvents enter the gearbox housing.

9 Disposal

ZIMM industrial gearboxes meet current standards and guidelines for the disposal of used devices and contain no poisonous substances that require special precautions.

➔ During disposal, make sure:

- to obey regional laws and provisions on waste disposal
- disposal and recycling is performed properly by a professional waste disposal company

The following materials must be disposed of:

- lubricants (grease or oil in the gearbox, lubricating grease on the spindle)
- steel parts (with varnish or coating)
- cast materials (housing, components)
- aluminium (components)
- bronze/copper (components, nuts, or coils of the motors)
- plastic parts (seals, etc.)

The manufacturer's information regarding add-on components must be noted, and must be requested from the manufacturer.

10 Operating manuals

For reasons of simplicity, operating manuals and safety instructions cannot contain all information on all designs of the gearboxes and cannot consider every conceivable case of installation, operation or maintenance. These instructions are essentially limited to what is needed for proper work performed by qualified personnel. If anything is unclear, please check with the manufacturer.

11 Warranty and liability

The manufacturer's warranty obligations are set forth in the respective delivery contract, which is neither supplemented nor restricted by these safety instructions or other instructions. These safety instructions must be kept in a safe place!

 NOTE

The warranty is forfeited if the ZIMM industrial gearbox is taken apart.
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→ ZIMM industrial gearboxes may be taken apart only by ZIMM or personnel authorised by ZIMM.
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